CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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I. ELECTRONIC DEVELOPMENTS AT KUCHINO

Low-Power High-Voltage Source

1. In Laboratory 3 (not Laboratory 1 as previously reported[1]) a Zamboni column was developed as a high-voltage source before September 1950. Aluminum, tin, or zinc folios of 30 mm diameter were separated by absorbent paper. The folios and paper were piled up and pressed together alternately one on top of another in a glass cylinder so that a column about 200 mm high resulted.

2. The arrested Russian electrotechnician Andreyev was concerned with this task; he also had to develop other galvanic elements and to take part in the galvanizing of wires. Electrical measurements of power and potential were done with a static voltmeter or with a ballistic galvanometer. About 1,200 volts were normally reached; the current was a maximum of 10-7 (sic) amps. This was looked upon as quite sufficient for the activation of an image converter, which had been developed at some place outside Kuchino.

3. In September 1951 the work was finished. Partly from the fact that the Zamboni column was used as a source of potential and that apparently no main apparatus was to be used, the Germans concluded that the image converter must be a portable apparatus with which one could, for example, make observations at night around a sentry post.

Small Dry Battery Elements

4. Some dry elements were also developed by Andreyev in the chemical section of Laboratory 3. These were to have the smallest possible dimensions and were to be used as heating and anode batteries in small portable and inconspicuous radio receivers. These elements were only seen in the finished state and nothing was discovered about the most satisfactory materials.

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 [redacted]

5. The heating batteries had roughly the shape and size of a matchbox. One cell gave 1.6 v. Usually two or four cells were placed together. For anode batteries, smaller cells were produced in plate form (galetin;sic) with a diameter of 15 mm. The plates were placed on top of one another and the lower surface of one plate made good contact with the upper surface of the next by means of a graphite paste; this also served to hold them together. The rim of a lower plate acted as a lead to the plate lying on top of it. Fifteen plates together had a height of 100 mm. At first the plates were made of lead but later, for reasons of material economy, plastic plates were used; each had a hole in its base of ten mm diameter, through which the graphite paste came into contact with the under surface of the inlaid lead electrodes. Prepared columns of these plates gave potentials of about 25 volts and could be loaded to a mximum of 5 ma.

Frontier Protection Wire

6. Work on this project proceeded in Laboratory 9 in 1950 and 1951. The wire was to protect otherwise unguarded stretches of frontier, particularly in difficult places of access. In experiments, about 40 meters of wire which resembled a single-core telephone lead were stretched over poles. The capacity of the wire against the earth varied when a vehicle or person passed under it. This property was then used to alter the frequency of a tuned circuit; this then gave a differential frequency against a similarly tuned circuit remaining constant. Nothing is known about the sensitivity of this system.

Submarine Buoy

7. Nothing further is known about this task.

Three-Stage Amplifier with Subminiature Tubes

8. In Laboratory 9, a three-stage amplifier was developed with a very large amplification factor (10^5), using subminiature tubes. This was to make the microphone current of a tiny microphone, which was apparently without batteries, audible in a loud-speaker. The unit was apparently to form a clandestine listening device, with a microphone which could be fastened inconspicuously in lamps, door latches, etc.

Soviet Quartz Crystal Group

9. Khazin, Soviet head of Laboratory 1, was [redacted] particularly interested in the production of quartz crystals by this group. In this group, headed by the physicist A.A. Ostrovskiy, there were a number of good Soviet technicians and polishers who made quartz plates and rods for prescribed frequencies. These quartzes were for the stabilization of oscillators. Khazin headed work on the development of the Brommy and Wullenwever D/F installations, and the Germans thought that these quartzes were prepared mainly for this work.[2] No quartzes were made for ultrasonic purposes. No further details are known.

Small Two-Volt DC Servomotor

10. In 1951 a German was asked by the head of Laboratory 3 for his advice on the development of tape recorders. On this occasion the Soviet Levkin mentioned that small motors were already available. Drawings of these had also been prepared; these drawings indicated that the motors had a permanent iron magnet and a rotor with an armature winding. They had a diameter of 20 mm and were used first as contact makers. Disks were applied which gave dots and dashes by means of cam switches. The German was of the opinion that these small motors were for position signal transmitters in unmanned balloons. Small alterations were suggested by the German to make these motors suitable for standard tape recorders. It is not known whether these alterations were successful.

Beta-Ray Excited Emitter

11. The Soviets [redacted] suggestion for the development of a beta-ray cathode were Zhelezov, Dobrozhanskiy, and Bergelson. Up to April 1950 a number of experimental preparations for the

task were made [redacted] to 25X1
build the pump stand needed for the experimental tubes. He received a three-stage mercury diffusion pump of British origin. [redacted] received 25 German Geiger 25X1
counters from war-booty stocks. Each consisted of a glass tube 30 mm in diameter and 300 mm long and metallized inside. [redacted] developed a circuit for 25X1
the amplification of the counter pulses and procured a piece of uranium glass which he had seen in the chemical laboratory. This glass was a Quader (sic) which measured 5 by 5 by 15 cms; [redacted] approach- 25X1
ing the measurement of the radioactivity of the uranium when the task was cancelled.

12. At first this project was strictly secret; no one outside the project was to know anything of it. Later, however, the Soviet Volkov and Bershadskiy, an engineer, were drawn into the work as interpreters; these two and possibly the latter's secretary were responsible for the other laboratories learning of the project. This lack of security may have been caused by the retraction of the task in April 1950.

13. [redacted] further work on this project was carried on at a place 25X1
where the MGB felt the specialists were more reliable.

Printed Circuits

14. The task of working on printed circuitry was given to a German specialist in Laboratory 1 (not Laboratory 3 as previously reported[4]) in July 1949. To learn more about the application of this process, the German demanded of Volkov and Khazin more exact details of the type of apparatus which was to be produced. It eventually became clear that the Soviets just wanted a sample. They had apparently heard of this American technique and wanted to use the process. They showed no interest in the preparation of the necessary machine tools and jigs or in the calculations necessary for the production of printed circuits.

15. The German specialist had to use primitive and time-wasting methods of making jigs. The impression of the circuits on the ceramic plate was done by a pantograph (Storch-schnabel). For the capacitances, dielectrics with high dielectric constants should have been laid into the ceramic plates. These were not available, however, so that finished condensors had to be soldered in. A paste for printing resistances was obtained only with the greatest difficulty. The institute at Kuchino lacked the fine grinding mills necessary to produce the paste. Eventually, a major who was responsible for supply obtained some paste through unofficial channels from a plant which normally produced potentiometers. Volkov suggested that the coils should be produced in such a way that they lay flat along the two surfaces of the plate so that their enclosed surfaces were very small and the coil values were very limited. The German strongly disputed Volkov about the pointlessness of this. Volkov gave the task to [redacted] another German. 25X1

16. The finished apparatus was to be used to receive a TV speech channel on 60 mc/s FM. Two subminiature tubes were used and demodulation was carried out in a primitive way by a superregenerative control [redacted] 25X1
The ceramic plates were baked by chemist Bershadskiy. The sample printed circuit was ready in May 1950 and was intended for demonstration purposes only.

Recording Machines

17. In Laboratory 3, there were two types of recorders in 1949. Both were table models and copies of German units of the type produced by AEG in 1945. Both used 19 mm-wide Agfa tape.

18. One of the types was known by the Russian code name Yantar (amber) and used German tubes; for example, the RV 12 P 2000. The other type used Soviet tubes. At this time, Laboratory 3 was working to replace the German Agfa tape with its own product. Tape and wire samples were being tested for coercivity. By 1950 the quality of the tape had not yet reached that of the German tape.

19. The laboratory received the task of developing the smallest recorder possible -- a pocket model. Wire rather than tape was necessary for a recorder of this size, so the production of suitable wire had to be considered before anything else. A wire was developed in 1951 by the arrested Soviet specialist Ogorodnikov in the chemical group of Laboratory 3. His wire was up to specifications: copper, brass, or bronze core of 0.15-mm diameter coated with an alloy of 80 percent nickel and 20 percent cobalt to a thickness of about three μ. The composition of this alloy was so chosen that its theoretical expected maximum coercivity was 300 oersteds. Nothing further is known about these tasks.

VHF Transmitter and Receiver

20. The LD-7 tube was used without success because the pulse was too long. The receiver was to be built by N.N. Fedorov in the electrophysical section. This was to be a detector receiver working without a source of current. Such receivers were to be placed in munitions or supply dumps to set off an explosion if enemy capture were threatened. The task was abandoned because it was impossible with the weak detector current to perfect a relay.

Transistors

21. In 1949 the Germans working with Volkov were commissioned to evaluate American literature on transistors and to draw up a plan for installations necessary for their development in Kuchino. After an intense study of available literature (particularly the work of Shockley, et al., in I.R.E. in 1948), the Germans drew up plans for transistor development stating that mass spectrographs, Hall-effect measuring instruments, vibration-free crystal cultivation apparatus, etc., were needed. Nothing more was heard of this project. [redacted] 25X1
silicon detectors had been produced at Fryazino, [redacted]
The Germans at Kuchino therefore thought it quite possible that transistors had been developed at Fryazino.

Spark Gaps

22. [redacted] conducted some work on this subject at Kuchino. He said that previously 25X1
at Gorkiy he had been able to produce pulses of one μ sec with a power of several mw. The pulses were to modulate radar transmitters. The production of pulses by means of spark gaps instead of by tubes is an economical method; [redacted] said 25X1
he had introduced it to the Soviets. He said that when he went to Gorkiy he discovered that the Soviets had no experience in this field; he found no modern work on the subject in Soviet technical literature.

23. In Kuchino, [redacted] producing pulses of 10 msec and 50 kw. These 25X1
pulses were to be produced singly by pressing a button. The production of radio pulses was conducted in connection with the development of a VHF transmitter using the LD-7 tube. Aluminum was used as the electrode material. Four kv were used as the potential source.

Subminature Tubes

24. The German specialists at Kuchino understood that there existed in the USSR a program to copy all types of American subminature tubes. Units which were to be supplied with such tubes were already developed before the tubes were available; American subminature tubes were used in such cases. The first examples of Soviet subminature tubes appeared at Kuchino in about 1950. Three types were seen in 1950 or 1951: a triode, an Hg pentode, and a power pentode. The quality of these tubes was not particularly noteworthy. The Germans thought, however, that first-quality tubes were not delivered to Kuchino. Many tubes failed in their first use through breakage of the heating coil. Others had limited lives. There was a wide dispersion of electrical data for various samples of the same type of subminature tubes.

II. TECHNICAL LITERATURE AT KUCHINO

25. Up to the end of 1950, foreign technical periodicals appeared in the library of Kuchino institute, at most, six weeks after publication. After 1950, however, entry of the majority of English-language periodicals seemed to be hindered in some way by the West: the institute only received copies, usually photocopied, which were of interest, and then only after a delay of about six months. In original copies, the advertising was usually subject to censorship. Often the instructions to censor a particular part arrived only after the periodical had been in the library for some weeks, so that it was possible to get a good idea of the intentions of the censors. "Help Wanted" ads were particularly liable to censorship; they indicated the salaries and other material conditions offered to applicants. Articles critical of the Soviet bloc or long, detailed articles with biographies were apt to be censored, apparently to conceal the differences of living standards between East and West. The censor used black paint or scissors on offending passages. Sometimes whole pages were eliminated.

26. Permission to see foreign literature was granted on a restricted basis and depended on the type of literature. The following three types of periodicals or extracts were subject to different rules:

a. Technical.

b. Social science.

c. Political.

Only the free or arrested Soviet who could prove their "need to know" received permission to read the first two types. Control over the technical periodicals was much less strict than control over the political ones. The group permitted to read the political literature was the smallest of the three.

27. The majority of Russian-language technical books in the library were translated from, or based on, foreign works whose authors were often not named. Only in the field of mathematics were there quite a few works by Soviet authors, Smirnov, for example. The Soviets who interested themselves in technical literature particularly wanted popular periodicals intended for the layman. Original contributions were scarcely studied by them. According to source, the following Western periodicals were in the Kuchino library:

Acoustical Society of America Journal /US/
Alta Frequenza /Italian/
Bell System Technical Journal /US/
Electrical Engineering /US/
Electronics /US/
Journal of Applied Physics /US/
Nature /US, UK, or French/
Onde Electrique /French/
Philips Research Reports /Dutch/
Philips Technische Rundschau /German edition of Dutch publication/
Physical Review /US/
Physikalische Blätter /West German/
Popular Mechanics Magazine /US/
RCA Review /US/
Reviews of Modern Physics /US/
Scientific Instrument[5]
Television /US or French/
Wireless Engineer /UK/

All leading East German technical periodicals were in the library.

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III. MISCELLANEOUS INFORMATION ON KUCHINO

Code Names of Projects

28. The project for building the first sample of a tape recorder was known under the Russian code name Yantar (amber). Informant did not know any other code names.

Postal Address

29. MGB Unit 568 had its headquarters in Moscow.[6] All official mail was distributed to the various departments by a courier from Moscow. Other mail for Kuchino bore the address "Department 568 K". Soviet prisoners at Kuchino could correspond with their relatives through a Moscow postal box, the number of which was changed from time to time. 25X1 German prisoners could correspond in the same way with relatives in the USSR, but not abroad.

30. The prison camp was a department of the Lefortova prison in Moscow which used the same postal box number as the Kuchino camp. However, source thought that Butyrskaya prison may later have become the main prison for supplying the Kuchino camp. These Moscow transit prisons had hospitals to which sick prisoners from Kuchino were taken.

Series Production

31. About 300 men and women worked in the production department at Kuchino. Of these, only a few of the men were prisoners. Small series of transmitters and receivers for agents were produced here. The Germans learned this from Soviet fellow-prisoners who worked in the department. No further details are known.

Changes in Organization

32. After informant was sent to another camp in September 1951, his information on the installation was gained only from Soviet prisoners who had been there. Informant thus learned that:

   a. At one time in late 1951 or early 1952, there had been a big transfer of laboratories to Marfino; little remained in Kuchino except the production section, Laboratory 8, and the library.

   b. The deaths of Stalin and Beriya had no effect on the organization or administration of the institute, but there were arrests and demotions. Zhelezov was finally employed as an assistant at Marfino.

   c. In 1953 source heard that Marfino was eventually to be closed and, by the end of 1953, Kuchino was to be restored to full operation.

Radio Monitoring

33. The Soviet prisoners believed that the reason for point a. (see preceding paragraph) was that a foreign station had broadcast a report on the existence of the Kuchino prison. The Soviet prisoners said that this information had been sent to the West by a secret transmitter in the institute itself. One of the Germans, however, did not think that a secret transmitter could possibly have evaded the careful radio listening posts. He himself had experienced how carefully the supervisors worked. When the institute began with a newly developed transmitter, it was barely 24 hours before radio monitors in Moscow got in touch with the head of the institute to ask what authority he had for illegal transmissions.

History of the Institute

34. In Unit 568 there were about 20 prisoners of particularly long standing, e.g., Fedor Stepanovich (snu) had been a prisoner since 1932 and had been sent to Kuchino before World War II. In 1942 he had gone with the prison camp to the

lower Volga in the neighborhood of the Urals (sic) and had returned with the camp to Kuchino after the war.

Other MGB Institutes

35. The prisoners in Kuchino knew that the MGB controlled similar prisoners camps in Marfino and in Spiridionka near Moscow (the Monastery of St. Spiridion). There possibly was an institute in Leningrad.

Other Research

36. Nothing is known of any MGB (or other) research or other work on bacteria, drugs, or clandestine weapons.

Material Supplies

37. In Kuchino, everything was at one time or another in short supply except iron, brass, copper wire, special hard paper, and mica. The Germans believed that there were no real shortages of materals but that the distributive organizations had failed in their function. Standard screws had to be specially made. Ceramic materials for HF insulators were in short supply and of poor quality. The quality of paper, even for writing purposes, was miserable. There were no paper condensors available. Polystyrol and Supertinax were nonexistent. Light metals were rationed. Informant was not surprised that ethyl alcohol and precious metals were strictly controlled, since he felt that the MGB could not entrust them to prisoners. From 1948 on, Soviet-made tubes which were copies of American types were available. These came from Leningrad and were generally of poorer quality than the original tubes. Tubes built with argon first appeared in 1950; they were copies of the American types 2050 and 887.

Discussions between Soviet and German Prisoners

38. The Soviet prisoners, many of whom were scientists or technicians, did not speak very willingly about their living conditions when they had been free. However, they were very interested in hearing about living conditions in the West, continuously asking the Germans exactly what living conditions were like. A Soviet technician could not get over the fact that his opposite number, with a wife and child, could obtain a three-room apartment with central heating and hot water in the West. The prisoners were interested in the salaries of various professions and wanted to know how their opposite numbers spent their salaries, e.g., how much for living accommodations, food, and clothing. Often the furniture and equipment of a typical apartment had to be described by the Germans. The Soviet prisoners, even a former colonel and the director of a factory, never had the luxury of a double bed or twin beds when married. Man and wife would sleep in one small bed; in a poorer family, children would sleep at the end of the bed.

39. The Soviet prisoners wanted to know about the prospects in various careers in the West, particularly in technical careers. They seemed disappointed that it was necessary to pay for schooling or for higher education in the West. The Germans were also asked about unemployment in the capitalist countries. Apparently the Soviet people learned a great deal through their contact with the West during and after the war that the government wished to hide from them. There was no doubt that the higher living standards of the average person in the West made a very great impression on the Soviet prisoners.

Grounds for Arrest

40. The Germans felt that a Soviet citizen was most subject to arrest when the MGB considered him a danger to the regime. The grounds given were often different and quite implausible. According to the Germans, the slightest word or action by a Soviet indicating that he considered the West was in any way better than the USSR would lead to his arrest. For example, a colonel who was a prisoner in one of the camps and who had taken part in the fighting in Berlin was arrested because he had brought an American gold coin or medal back to the USSR as a souvenir.

He showed it to a number of people as an interesting curiosity. He was arrested by the MGB on the charge that he had obviously received the money from Americans for espionage. Everyone realized that this was ridiculous and that the real reason for his arrest was that he might cause people to think about the superiority of the US, which had gold coins, over the USSR, which had none.

41. Another example of grounds for arrest involved a Russian automobile designer in one of the prison camps. He had been given the task of copying an American car after long study in the US. When he had finished his work, he said he was very dissatisfied with the first sample of his own work. Nevertheless, this was taken as an expression of inferiority of the Russian model as compared with the American. He was arrested.

State of Soviet Research

42. For the following reasons, informant felt that Soviet research and development can never reach the same level as in the West:

a. The planned economy -- Scientists are so completely hamstrung by the system of planning that they can never work to their full capacity. The offices which issue materials for a development contract expect a complete list of material requirements before the start of any work. When the plan is drafted, arbitrary cuts are made on the grounds of economy. After the approval of development costs, it is impossible officially to submit a supplementary plan or pay cash for any materials required for completion. Extra requirements can only be filled by bribery or by barter. The plan assumes not only that the approved money has been correctly allotted, but also that plants well meet planned deliveries.

b. Personnel -- The preliminary education of technical and scientific personnel is insufficient and too one-sided for successful research work. In addition to political subjects, the many institutes teach technical subjects so elementary that, later, specialists in different fields find it almost impossible to understand each other. Only the few scientists of the old school have extensive knowledge. Because of the gap in higher education caused by the Revolution, the continuity and traditions of science are lacking and, consequently, successful development and research work can only be achieved with difficulty. At present, remarkable advances have been made by the Soviets only in mathematics; foreign scientists have been deceived by that. In all technical spheres, achievement is far behind that of the West and is limited to imitation of western developments. Creative achievement in the technical and scientific spheres has not existed for a long time. These circumstances cannot be altered for a long time, so the USSR will not be able to compete with the West for a very long time. In general, there were very few Soviet specialists who were competent to carry out satisfactorily the tasks given them. Even those few could not exercise full competence because of the shortage of technical help. Leading Soviets understood too little of technology. They were inclined to look at every specialist, particularly the Germans, as a magician who could produce something out of nothing. It was remarkable that high bonuses were paid to the laboratory heads even when their workers had merely succeeded in copying well-known Western apparatus.

c. Scientist prisoners -- The intelligentsia are filling many prisons and work camps. Forced labor has destroyed all the traditions of teaching institutions. The MGB realized that the imprisoned technicians represented "floating capital". Consequently, institutes were formed to use imprisoned specialists in their own fields. The success of these institutes was limited since institute and laboratory heads were not specialists but MGB officers. The specialists knew how to sabotage work, or at least did not accomplish as much as if they had been free.

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